



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H04M 15/00, H04Q 3/00, 7/38	A1	(11) International Publication Number: WO 00/11859 (43) International Publication Date: 2 March 2000 (02.03.00)
---	-----------	---

(21) International Application Number: PCT/EP99/05994

(22) International Filing Date: 16 August 1999 (16.08.99)

(30) Priority Data:
981797 21 August 1998 (21.08.98) FI(71) Applicant: TELEFONAKTIEBOLAGET L M ERICSSON
(publ) [SE/SE]; S-126 25 Stockholm (SE).

(72) Inventors: FABRITIUS, Mirka; Jaalaranta 10 A 1, FIN-00180 Helsinki (FI). GUSTAFSSON, Mia; Värmobackavägen 14 B 18, FIN-00360 Helsinki (FI). SUIHKO, Timo; Sandweg 35, D-52072 Aachen (DE). TOIVANEN, Kyösti; Nummikuja 2 C 12, FIN-02400 Kirkkonummi (FI). LAIHO, Keijo; Metsätörpantie 2 G 20, FIN-02430 Masala (FI). SIMONEN, Satu; Palkkatilankatu 7 C 25, FIN-00240 Helsinki (FI).

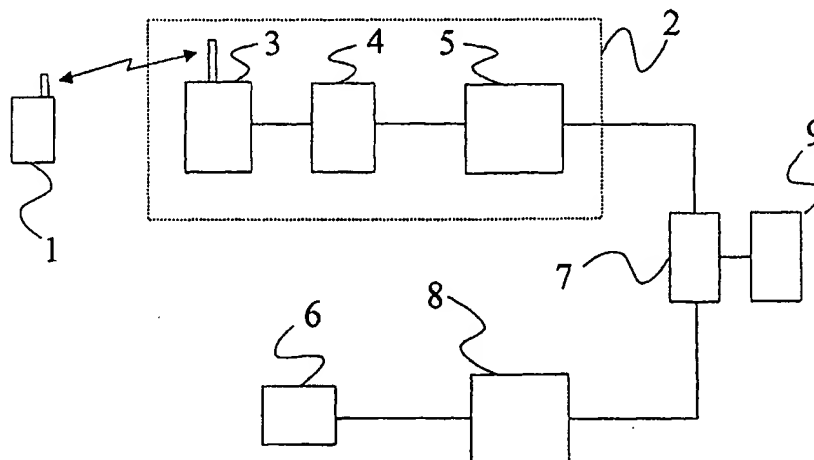
(74) Agent: BORENIUS & CO OY AB; Kansakoulukuja 3, FIN-00100 Helsinki (FI).

(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published

With international search report.

(54) Title: CHARGING IN A TELECOMMUNICATIONS SYSTEM



(57) Abstract

A method of charging at a mobile switching centre, MSC (5) of a mobile telecommunications network (2) in respect of a call initiated by a mobile terminal (1) registered with the network (2) and terminating outside of the network. At the MSC (5) the call is classified, according to the associated A-number and/or the B-number, as corresponding either to a call for which the MSC (5) is to be the charge determination point or to a call for which the charge determination point is located outside of the mobile telecommunications network (2). In the event that the call belongs to the latter class, the MSC (5) receives tariff information from the external charge determination point (7, 9) and calculates charge information on the basis of the received tariff information. In the event that the call belongs to the former class, the MSC (5) disregards any tariff information received from an external charge determination point and calculates charge information on the basis of the mobile telecommunications network's own tariff information.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

Charging in a Telecommunications System

Field of the Invention

4

The present invention relates to charging in a telecommunications system and more particularly, though not necessarily, to charging in a system in which a mobile terminal is connected through a mobile switching centre to make use of a service facilitated by an intelligent network.

12 Background to the Invention

As the number of exchanges in modern telecommunications networks has increased, there has been a tendency to centralise supplementary services (including call diversion, toll-free number access, premium rate number access, etc) in certain specialised network nodes. Typically, these nodes are directly associated with only a relatively small number of exchanges. Callers requiring access to the supplementary services, but who are not directly connected to an exchange providing the service, are routed to a suitable exchange via their local exchange and possibly one or more transit exchanges. This technique of centralising supplementary services is often referred to as "Intelligent Networks".

28 In modern telecommunications networks, a node for detecting calls to an IN service is often referred to as a Service Switching Point (SSP). After detection of a call, an SSP communicates with a node having particular knowledge (e.g. a terminating B-number) of the IN service, termed the Service Control Point (SCP), to obtain information on how the connection is to be set up. Communication between the SSP and the SCP often makes use of (or is based upon) a standardised interface

protocol known as ETSI CS1 (ETSI: ETS 300 374-1: see also ITU-T recommendations Q1218 1993 & 1995).

- 4 It will be appreciated that a caller (being allocated some A-number) will often be charged for making use of an IN service. For example, if a caller places a call to a premium rate number (e.g. a sports hotline) then he
8 will be charged at some appropriate tariff. One function therefore of the SSP is to return to the SCP information which enables the SCP to determine if the accessed IN service is chargeable and, if so, the
12 appropriate tariff. This information is normally provided to the SCP by the SSP following the termination of a call. This use of so-called "flexible charging" may be applied more generally in telecommunications
16 systems and is described in more detail in ICBS (Interconnection Charge Billing System) published by the Interconnection Charge Billing Forum, Tokyo, Japan.
- 20 There is currently a desire to be able to provide real time charging information to network operators and indeed to network users. This is particularly true in the case of mobile telephone users where much of the
24 necessary technology is already in place, e.g. mobile telephones usually have a liquid crystal display on which real time charging information can be displayed.
- 28 The Japanese ARIB standard RCR STD-27x provides for charging information services known as Advice of Charge (AoC). The AoC service offers the possibility of informing a mobile terminal of the charge for a call
32 originated by the terminal. Charge information is sent to the terminal upon release of the call. TTC JJ-70.10 also defines a so-called Inter-Network Charge Information Transmission (INCIT) functionality which
36 provides for the exchange of certain call-related

charging information between so-called visited and home networks. One further service which is available in some networks (although not yet standardised) is known
4 as Charge Rate Information (ChRI). ChRI provides a charging notification element (containing charging information and a charge rate) to an originating terminal, either during call set-up or during the call
8 itself, which allows the terminal to calculate the call cost.

In mobile telephone networks, telephone calls and
12 associated signalling information are routed through a Mobile Switching Centre (MSC) which is analogous to a conventional telephone exchange. One of the functions of the MSC is to collect charging information on
16 individual calls and to record that information for later billing. It is already possible to provide certain real time billing information to mobile subscribers based upon the data recorded at the MSC.
20 However, this information relates only to basic call charges which can be calculated by the MSC based upon the location of the caller and of the called party. There exists no mechanism by which additional tariff
24 information relating to an accessed IN service can be communicated to an originating MSC from an SSP/SCP node controlling the IN service. The same limitation applies to the general communication of tariff information
28 across network boundaries, e.g. where operators have a cross-billing arrangement.

Summary of the Present Invention

32 An object of certain aspects of the present invention is to overcome or at least mitigate the above noted disadvantage of existing telecommunications networks.
36 In particular, it is an object to provide for the communication of tariff information from an external

charge determination point to a mobile switching centre acting as charging point for a call originating mobile terminal, depending upon the classification of the call.

4

According to a first aspect of the present invention there is provided a method of determining charging information at a mobile switching centre of a mobile telecommunications network in respect of a call initiated by a mobile terminal registered with the network and terminating outside of the mobile switching centre, the method comprising, at the mobile switching centre:

classifying said call according to the associated A-number and/or the B-number as corresponding either to a call for which the mobile switching centre is to be the charge determination point or to a call for which an external node is to be the charge determination;

in the event that the call belongs to the latter class, receiving tariff information from the external charge determination point and calculating charge information on the basis of the received tariff information; and

in the event that the call belongs to the former class, disregarding any tariff information received from an external charge determination point and calculating charge information on the basis of the mobile telecommunications network's own tariff information.

28

Preferably, in the event that the call belongs to the class for which the charge determination point is located outside of the mobile switching centre, a Request for Charge Information is sent by the mobile switching centre to the external charge determination point. More preferably, this request is sent as a flag contained in an Initial Address Message, transmitted as part of the call set-up phase.

Preferably, said tariff information comprises a Charge Information (CI) parameter, giving a call unit rate (or
4 a set of call unit rates), and a Charge Information Type (CIT) parameter, indicating whether or not the CI parameter provides flexible charging information.

8 Preferably, the class of calls for which the charge determination point is located outside of the mobile switching centre, includes calls having A or B-numbers associated with Intelligent Network Services. More
12 preferably, for such calls, the method comprises the steps of:

directing a request for access to the Intelligent Network service from the mobile switching centre to a
16 service switching point of the system, together with a request for charging information, both of said requests being contained within an Initial Address Message sent as part of a call set-up routine;

20 in response to receipt of said Initial Address Message containing said request for charging information at the service switching point, sending a charging indicator request from the service switching point to a
24 service control point having knowledge of the requested service;

in response to receipt of said charging indicator request at the service control point, sending a tariff
28 indicator associated with the requested service from the service control point to the service switching point;
and

determining at the service switching point,
32 charging parameters on the basis of at least the received tariff indicator, and sending said charging parameters to said mobile switching centre.

36 Embodiments of the present invention enable IN service related charging information to be delivered from an IN

service access node to a mobile switching centre. A mobile switching centre is therefore able to deliver accurate charging information to a calling mobile
4 terminal, or to other components of the telecommunications system. The IN service access node may be located either in the mobile network or in a foreign network.

8
Preferably, said charging parameters are sent from the service switching point to the mobile switching centre during the call set-up routine. More preferably, said
12 charging parameters are included in an address complete message (or an early address complete message). Preferably, the charging parameters determined at the service switching point are a charge information
16 parameter and a charge information type parameter.

Preferably, communications between the service switching point and the service control point are based upon the
20 ETSI CS1 protocol. Said charging indicator request is then sent from the service switching point to the service control point as a flexible charging indicator parameter contained in an InitialDP message. The tariff
24 indicator may be returned in response as a parameter contained within the SendChargingInformation (SCI) message. More preferably, determination of said charging parameters at the service switching point is
28 triggered by the subsequent receipt thereof of a message, sent from the service control point, containing a flexible charge request indicator.

32 Preferably, said charge information calculated by the mobile switching centre is employed either for AoC, ChRI, or INCIT service.

36 According to a second aspect of the present invention there is provided apparatus for determining charging

information at a mobile switching centre of a mobile telecommunications network in respect of a call initiated by a mobile terminal registered with the
4 network and terminating outside of the mobile switching centre, the apparatus comprising, at the mobile switching centre:

classification means for classifying said call
8 according to the associated A-number and/or the B-number as corresponding either to a call for which the mobile switching centre is to be the charge determination point or to a call for which the charge determination point is
12 located outside of the mobile switching centre;

first processing means arranged, in the event that the call belongs to the latter class, to receive tariff information from the external charge determination point
16 and calculating charge information on the basis of the received tariff information, or, in the event that the call belongs to the former class, to disregard any tariff information received from an external charge
20 determination point and to calculate charge information on the basis of the mobile telecommunications network's own tariff information.

24 Detailed Description of Certain Embodiments

For a better understanding of the present invention and in order to show how the same may be carried into effect
28 reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 illustrates schematically a telecommunications system connecting an originating
32 mobile terminal to a terminating terminal; and

Figure 2 illustrates signalling over a portion of the system of Figure 1 during a call set-up phase.

36 The invention is exemplified below with reference to certain Japanese TTC standards. However, it will be

understood that the invention is also applicable to other telecommunications standards.

4 In Figure 1, a mobile cellular telephone is indicated by reference numeral 1. The terminal 1 is assumed to be registered with a cellular network 2, with signalling and call traffic being routed through cellular base station 3, a base station controller 4, and a mobile switching centre 5. This particular mobile switching centre 5 is referred to hereinafter as the Visited mobile switching centre (VMSC). For calls originating from the mobile telephone 1, the charging point is the VMSC 5.

Assume that the mobile telephone 1 initiates a call by dialling a certain telephone number. Assume further that the dialled number is associated with some Intelligent Network IN service such as a premium rate information line (e.g. providing sports information). The IN nature of the call may be indicated by the number prefix, e.g. 0800, referred to as an "IN-prefix". The call termination point will be a telephone terminal 6 provided with automatic answering and message playback facility. A traffic channel is established through the telecommunications network between the mobile terminal 1 and the telephone terminal 6 during an initial set-up phase. This process involves the transfer of signalling information between network exchanges (5,7,8) based upon the Signalling System No.7 (TTC standards JT-Q761-4 and JT-Q766).

32 The set-up phase commences with the sending of an Initial Address Message (IAM) from the VMSC 4 to a Service Switching Point (SSP) 7 identified by the dialled number prefix, assuming that the SSP 7 is directly connected to the VMSC 4 as is illustrated in

Figure 1. The IAM comprises a number of parameters required to establish a traffic channel between the VMSC 4 and the terminating telephone terminal 6, via the SSP 7.

The SSP 7 contains the intelligence necessary to identify the placed call as a call associated with an IN service. Therefore, upon receipt of the IAM, the SSP 7 communicates with a Service Control Point (SCP) 9 associated with SSP 7, to establish further details concerning the IN service. These details may include the destination number (B-number) for the call, in which case the SSP 7 relays the received IAM to the destination exchange (Dex) 8 associated with that B-number (assuming again that the SSP 7 is directly connected to that destination exchange 8 as illustrated in Figure 1) in order to establish a traffic channel between the SSP 7 and the destination exchange 8. The IAM may be modified by the SSP 7 prior to it being forwarded to the exchange 8; typically, the ReqCI flag (see below) is reset to prevent subsequent nodes from attempting to return charging information to the SSP 7.

In order to confirm channel allocation, the destination exchange 8 returns to the SSP 7, a so-called Address Complete Message. The ACM is then relayed (modified as described below) by the SSP 7 to the VMSC 4 to confirm that the end-to-end connection is now established.

Knowledge of the tariff rate associated with the requested IN service is held by the SCP 9. In order to propagate this information to the VMSC 4, the IAM sent from the VMSC 4 to the SSP 7 during the set-up phase contains a Charging Plan (CHP) parameter and a new parameter referred to here as a Request for Charging Information (ReqCI) parameter. The CHP is a parameter assigned to the calling subscriber which identifies the

way in which the subscriber should be treated from the charging point of view, e.g. "standard plan", "low call plan", etc. The ReqCI parameter is a flag (use may be
4 made of one of the special forward call indicator bits of the IAM) which, when set, notifies the SSP 7 that it should obtain tariff information from the SCP 9 and return this to the VMSC.

8
It is important to note that the VMSC 4 contains intelligence which recognises the call as an IN call - i.e. meaning that, whilst the VMSC 4 remains the
12 charging point, the charge determination point lies outside the mobile network - and consequently sets the ReqCI flag in the IAM. Recognition is made by determining whether or not the B-number belongs to an IN
16 number series.

It has already been mentioned above that the SSP 7 communicates with the SCP 9 via an ETSI CS1 based
20 interface (see in particular TTC JT-Q1218 and JT-Q1218B). More particularly, the SSP 7 requests information on the requested IN service by sending an Initial Detection Point (InitialDP) message to the SCP 9
24 upon receipt of the IAM. The InitialDP message contains a Service Key determined by the SSP 7 and which identifies the requested IN service. The detection of the ReqCI parameter in the IAM causes the SSP 7 to
28 include also in the InitialDP message a request for tariff information. This request consists of an extension field termed a Flexible Charging Indicator (FCI).

32
When the SCP 9 identifies that the FCI flag is set, if Flexible Charging applies to the IN service, a Tariff Indicator (TI) parameter is identified and transmitted
36 from the SCP 9 to the SSP 7 as part of a

SendChargingInformation (SCI) message. The TI parameter identifies the tariff rate associated with the IN service and is held by the SSP 7 until a Flexible
4 Charging Request Indicator (FCRI) flag is set and subsequently transmitted from the SCP 9 to the SSP 7 as an extension field of a Connect message (or of a ConnectToResource or EstablishTemporaryConnection
8 message).

Included in the IAM sent from the VMSC 4 to the SSP 7 is a parameter which identifies the location of the
12 originating mobile telephone 1. This parameter is known as the Originating Charging Area (OCA). Included in the ACM message returned to the SSP 7 by the destination exchange 8 is a corresponding Terminating Charging Area
16 (TCA) parameter. Both the OCA and TCA parameters are used by the SSP 7, in combination with the TI received from the SCP 9 and the CHP, to determine a parameter referred to as Charge Information (CI). The CI
20 parameter is transmitted in the ACM message (or alternatively in an earlyACM) sent by the SSP 7 to the VMSC 4 and provides a unit rate indicator (e.g. 10 or 100 Yen), a charge rate information category, and the
24 charge rate information itself (i.e. tariffs).

It is noted that the ACM returned to the VMSC 4 contains a further parameter referred to as Charging Information
28 Type (CIT). This parameter indicates whether or not the CI parameter provides flexible charging information and is used by the VMSC 4 to indicate whether the ACM contains a CI parameter which should be extracted.

32

Reference should be made to the signalling diagram of Figure 2 which summarises the set-up phase signalling process in the system of Figure 1.

36

It will be appreciated by the skilled person that various modifications may be made to the above described embodiment without departing from the scope of the present invention. For example, if the TCI is received by the SSP 7 after the ACM has been sent, the Charge Information may be sent in a CHG message (assuming that a Charge Information Delay flag is was set in the eACM). It is also noted that the ReqCI flag may be included in a segmentation message (SGM), following an IAM message, providing that the SGM is flagged in the IAM. Alternatively, the ReqCI flag may be included in an Application Transport Parameter (APP) according to the so-called Application Transport Mechanism (APM).

It will also be appreciated that whilst the invention has been illustrated above with a system in which the IAM VMSC 4 is connected directly to the IN service SSP 7, and the IN service SSP 7 is connected directly to the destination exchange 8, connection in one or both cases may be via one or more intermediate exchanges/nodes.

It is also noted that sending of the ReqCI flag in the IAM by the VMSC may be triggered on the basis of the calling subscriber A-number rather than the destination B-number. In this case, for example, the VMSC may inspect a Home Location Register (HLR) to determine whether or not the caller's A-number is associated with an IN service and hence whether or not the ReqCI flag should be set.

In a modification to the embodiment described above with reference to Figures 1 and 2, in certain cases no ReqCI flag may be sent by the VMSC in the IAM. Rather, tariff information may be automatically returned to the VMSC from any external charge determination point. In this case, the VMSC decides, on the basis of the A-number and/or the B-number, whether to make use of any received

tariff information or to discard that information.

Claims

1. A method of determining charging information at a
4 mobile switching centre of a mobile telecommunications
network in respect of a call initiated by a mobile
terminal registered with the network and terminating
outside of the mobile switching centre, the method
8 comprising, at the mobile switching centre:
classifying said call according to the associated
A-number and/or the B-number as corresponding either to
a call for which the mobile switching centre is to be
12 the charge determination point or to a call for which an
external node is to be the charge determination;
in the event that the call belongs to the latter
class, receiving tariff information from the external
16 charge determination point and calculating charge
information on the basis of the received tariff
information; and
in the event that the call belongs to the former
20 class, disregarding any tariff information received from
an external charge determination point and calculating
charge information on the basis of the mobile
telecommunications network's own tariff information.
24
2. A method according to claim 1, wherein, in the
event that the call belongs to the class for which the
charge determination point is located outside of the
28 mobile switching centre, a Request for Charge
Information is sent by the mobile switching centre to
the external charge determination point.
- 32 3. A method according to claim 2, wherein said Request
for Charge Information is sent as a flag contained in an
Initial Address Message, transmitted as part of the call
set-up phase.

4. A method according to any one of the preceding claims, wherein said tariff information comprises a Charge Information (CI) parameter, giving one or more call unit rates, and a Charge Information Type (CIT) parameter, indicating whether or not the CI parameter provides flexible charging information.
5. A method according to any one of the preceding claims, wherein the class of calls for which the charge determination point is located outside of the mobile switching centre, includes calls having A or B-numbers associated with Intelligent Network Services.
6. A method according to claim 5, the method comprising the steps of:
- directing a request for access to the Intelligent Network service from the mobile switching centre to a service switching point of the system, together with a request for charging information, both of said requests being contained within an Initial Address Message sent as part of a call set-up routine;
 - in response to receipt of said Initial Address Message containing said request for charging information at the service switching point, sending a charging indicator request from the service switching point to a service control point having knowledge of the requested service;
 - in response to receipt of said charging indicator request at the service control point, sending a tariff indicator associated with the requested service from the service control point to the service switching point;
 - and
 - determining at the service switching point, charging parameters on the basis of at least the received tariff indicator, and sending said charging parameters to said mobile switching centre.

7. A method according to claim 6, wherein said
charging parameters are sent from the service switching
4 point to the mobile switching centre during the call
set-up routine.

8. A method according to claim 7, wherein said
8 charging parameters are included in an address complete
message.

9. A method according to claim 8, wherein the charging
12 parameters determined at the service switching point are
a charge information parameter and a charge information
type parameter.

16 10. A method according to claim 6 or 7, wherein
communications between the service switching point and
the service control point are based upon the ETSI CS1
protocol, and said charging indicator request is sent
20 from the service switching point to the service control
point as a flexible charging indicator parameter
contained in an InitialDP message and the tariff
indicator is returned in response as a parameter
24 contained within the SCI message.

11. A method according to claim 10 when appended to
claim 6, wherein determination of said charging
28 parameters at the service switching point is triggered
by the subsequent receipt thereof of a message, sent
from the service control point, containing a flexible
charge request indicator.

32

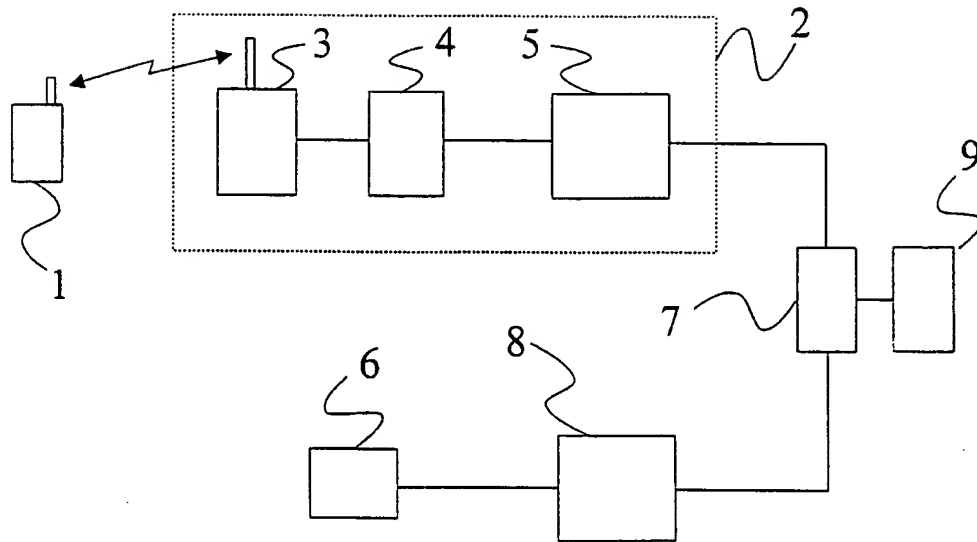
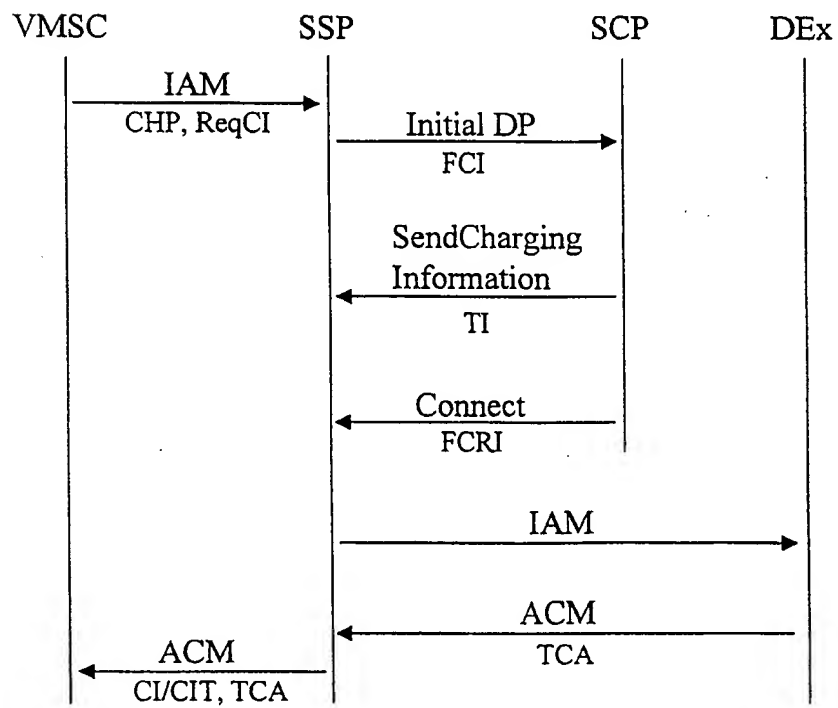
12. Apparatus for determining charging information at a
mobile switching centre of a mobile telecommunications
network in respect of a call initiated by a mobile
36 terminal registered with the network and terminating

outside of the network, the apparatus comprising, at the mobile switching centre:

- classification means for classifying said call
- 4 according to the associated A-number and/or the B-number as corresponding either to a call for which the mobile switching centre is to be the charge determination point or to a call for which the charge determination point is
- 8 located outside of the mobile telecommunications network;

- first processing means arranged, in the event that the call belongs to the latter class, to receive tariff
- 12 information from the external charge determination point and calculating charge information on the basis of the received tariff information, or, in the event that the call belongs to the former class, to disregard any
- 16 tariff information received from an external charge determination point and to calculate charge information on the basis of the mobile telecommunications network's own tariff information.

1/1

Fig 1Fig 2

INTERNATIONAL SEARCH REPORT

International Application No.

PC., EP 99/05994

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04M15/00 H04Q3/00 H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 20571 A (NOKIA TELECOMMUNICATIONS OY ;JANHONEN RISTO (FI); TUOHINO MARKKU () 4 July 1996 (1996-07-04) page 3, line 14 -page 5, line 19 page 12, line 14 - line 25 page 13, line 1 -page 16, line 32 ---	1-12
A	WO 94 28670 A (NOKIA TELECOMMUNICATIONS OY ;SALMELA SEIJA (FI); LAATU JUHO (FI);) 8 December 1994 (1994-12-08) page 2, line 20 -page 4, line 17 page 9, line 25 -page 10, line 31 page 12, line 1 -page 13, line 6 ---	1-4
A	DE 195 15 418 A (SIEMENS AG) 31 October 1996 (1996-10-31) column 3, line 4 - line 54 figure 2 -----	1-4

☐ Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

16 November 1999

Date of mailing of the international search report

23/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Patlaka, E.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/05994

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9620571 A	04-07-1996	FI 946092 A AU 701458 B AU 4305796 A CA 2207420 A CN 1171186 A EP 0801874 A JP 10511522 T NO 972893 A	24-06-1996 28-01-1999 19-07-1996 04-07-1996 21-01-1998 22-10-1997 04-11-1998 20-08-1997
WO 9428670 A	08-12-1994	FI 932480 A AU 6798194 A	01-12-1994 20-12-1994
DE 19515418 A	31-10-1996	NONE	

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.